IT IS CLAIMED:

1. A device for detecting or quantitating a plurality of different analytes in a liquid sample, said device comprising

a substrate defining a sample-distribution network having (i) a sample inlet, (ii) one or more detection chambers, and (iii) channel means providing a dead-end fluid connection between each of said chambers and said inlet, wherein each of said chambers includes an analyte-specific reagent effective to react with a selected analyte that may be present in such sample, to produce a detectable signal,

said substrate providing, for each chamber, detection means for detecting such signal,

whereby evacuation of said network, followed by application of the sample to said inlet, is effective to draw sample by vacuum into each of said chambers.

2. The device of claim 1, wherein said channel means includes a single channel to which said detection chambers are connected by said fluid connections.

3. The device of claim 1, wherein said channel means includes a first channel to which a first group of detection chambers are connected by such dead-end fluid connections, and a second channel to which a second group of detection chambers are connected by such dead-end fluid connections.

4. The device of claim 1, wherein said channel means includes an individual channel for each detection chamber, for providing a dead-end fluid connection between said inlet and each detection chamber.

5. The device of claim 1, which further includes a vacuum port connected to said channel means at a site in fluid communication with the sample inlet and detection chambers.

6. The device of claim 5, wherein said vacuum port is connected to said channel means at a site that is downstream of said detection chambers.

7. The device of claim 1, which further includes a non-flowthrough vacuum reservoir in fluid communication with said channel means.

8. The device of claim 1, wherein said detection means includes an optically transparent window associated with each detection chamber, through which such signal can be optically detected.

9. The device of claim 1, wherein the analytes are polynucleotides, and at least two of said detection chambers each contain detection reagents for detecting different polynucleotide analytes.

10. The device of claim 9, wherein the analyte-specific detection reagents include first and second oligonucleotide primers having sequences effective to hybridize to opposite end regions of complementary strands of a selected polynucleotide analyte segment, for amplifying the segment by primer-initiated polymerase chain reaction.

11. The device of claim 10, wherein said analyte-specific detection reagents further include a fluorescer-quencher oligonucleotide capable of hybridizing to the analyte segment in a region

downstream of one of the primers, for producing a detectable fluorescent signal when the analyte is present in the sample.

12. The device of claim 9, wherein the analyte-specific detection reagents include first and second oligonucleotides effective to bind to adjacent, contiguous regions of a target sequence in the selected analyte, for oligonucleotide ligation assay detection of the analyte.

13. The device of claim 12, wherein the analyte-specific detection reagents include a second pair of oligonucleotides which are effective to bind to adjacent, contiguous regions complementary to the regions bound by the first pair of oligonucleotides, for amplification of the polynucleotide analyte by ligase chain reaction.

14. The device of claim 9, wherein the analyte-specific detection reagents include a binding polymer effective to hybridize to a selected sequence in the polynucleotide analyte, and the binding polymer includes a fluorescent dye moiety which produces a detectable signal upon hybridizing to the selected sequence.

15. The device of claim 9, wherein the analyte-specific reagents additionally include an intercalating compound which produces an optically detectable signal upon intercalating a double-stranded polynucleotide.

16. The device of claim 1, wherein the analyte-specific reagents in each chamber include an antibody

specific for a selected antigen which may be present in the sample.

17. The device of claim 1, wherein the analyte-specific reagents in each chamber include an antigen for reacting with a selected analyte antibody which may be present in the sample.

18. The device of claim 1, wherein said substrate further includes temperature regulating means for controlling the temperature of each detection chamber.

19. The device of claim 1, wherein said substrate defines at least two such sample-distribution networks.

20. The device of claim 1, wherein the interior of said network is under vacuum.

21. A method for detecting or quantitating one or more of a plurality of analytes in a liquid sample, said method comprising

providing a device in accordance with claim 1, wherein the interior of the network is under vacuum,

applying a liquid sample to the sample inlet and allowing the sample to be drawn into the network by vacuum action to deliver the sample to the detection chambers,

allowing the delivered sample to react with the analyte-specific reagents in each detection chamber under conditions effective to produce a detectable signal in each detection chamber when the selected analyte is present in the sample, and

measuring the signals produced in the reaction chambers to determine which selected analytes are present in the sample.

22. The method of claim 21, wherein said channel means includes a single channel to which said detection chambers are connected by said fluid connections.

23. The method of claim 21, wherein said channel means includes a first channel to which a first group of detection chambers are connected by such fluid connections, and a second channel to which a second group of detection chambers are connected.

24. The method of claim 21, wherein said channel means includes an individual channel for each detection chamber, for providing a dead-end fluid connection between said inlet and each detection chamber.

25. The method of claim 21, wherein said device further includes a vacuum port connected to the channel means at a site in fluid communication with the sample inlet and detection chambers, and prior to said applying, said network is evacuated by applying a vacuum to the vacuum port.

26. The method of claim 25, wherein said vacuum port is connected to the channel means at a site that is downstream of said sample inlet and said detection chambers.

27. The method of claim 21, wherein said device further includes a non-flowthrough vacuum reservoir in fluid communication with said channel means.

28. The method of claim 21, wherein the analytes are polynucleotides, and at least two of said detection chambers each contain detection reagents for detecting different polynucleotide analytes.

29. The method of claim 28, wherein the analyte-specific reagents include an oligonucleotide primer pair suitable for amplifying, by polymerase chain reaction, an analyte segment which is flanked by sequences complementary to the primer pair.

30. The method of claim 29, wherein said analyte-specific detection reagents further include a fluorescer-quencher oligonucleotide capable of hybridizing to the analyte segment in a region downstream of one of the primers, for producing a detectable fluorescent signal when the analyte is present in the sample.

31. The method of claim 28, wherein the analyte-specific detection reagents include first and second oligonucleotides effective to bind to adjacent, contiguous regions of a target sequence in the selected analyte, for oligonucleotide ligation assay detection of the analyte.

32. The method of claim 31, wherein the analyte-specific detection reagents include a second pair of oligonucleotides which are effective to bind to adjacent, contiguous regions complementary to the regions bound by the first pair of oligonucleotides, for amplification of the polynucleotide analyte by ligase chain reaction.

33. The method of claim 28, wherein the analyte-specific detection reagents include a binding polymer effective to hybridize to a selected sequence in the polynucleotide analyte, and the binding polymer includes a fluorescent dye moiety which produces a

detectable signal upon hybridizing to the selected sequence.

34. The method of claim 28, wherein the analyte-specific reagents additionally include an intercalating compound which produces an optically detectable signal upon intercalating a double-stranded polynucleotide.

35. The method of claim 21, wherein the analyte-specific reagents in each chamber include an antibody specific for a selected antigen which may be present in the sample.

36. The method of claim 21, wherein the analyte-specific reagents in each chamber include an antigen for reacting with a selected analyte antibody which may be present in the sample.

37. The method of claim 21, wherein said substrate further includes temperature regulating means for controlling the temperature of each detection chamber.

38. The method of claim 21, wherein said substrate defines at least two such sample-distribution networks.

39. The method of claim 21, wherein said providing includes filling said network with carbon dioxide gas, prior to placing said network under vacuum.

40. The method of claim 21, wherein the analyte is a drug candidate, and the detection reagents include a drug target.

add C1